

## CHAPTER 2

### DEVELOPMENT OF IRRIGATION IN KOLHAPUR DISTRICT



#### 2.1 PHYSICAL FEATURES OF KOLHAPUR DISTRICT

##### 2.1.1 Location

Kolhapur district lies between 15° and 17° North latitude and 73° and 74° East longitude. It is bounded on the north by Sangli district, on the west by Ratnagiri district and on the south and east by Belgaum district of Karnataka State.

The district lies in the Krishna-Panchaganga basin and is fed by a large number of tributaries which originate in the western hill tops and flow over the slope of Sahyadri towards the eastern part of the district. The physical setting of Kolhapur district can be best appreciated in the background of its relief and drainage. The district is a part of the Deccan table-land with an average height of 1,800 ft. above mean seal level, with the Sahyadrian scarp forming the most prominent feature along its western administrative boundary. Kolhapur district is at the tail-end of Maharashtra State.

District Kolhapur covers an area of 8,047.0 sq.kms. and has a population of 25,06,330 as per 1981 Census. It ranks 23rd in the area and 9th in population among the 30 districts of Maharashtra State. Kolhapur is one of the smallest districts in the State in respect of area and fairly on the high side in respect of population. There are twelve talukas in Kolhapur

district, namely, Karvir, Panhala, Hatkanangale, Shirol, Kagal, Gadhinglaj, Chandgad, Ajra, Bhudargad, Radhanagari, Gagan Bavada and Shahuwadi.

### **2.1.2 Climate**

The climate of Kolhapur district is generally temperate and the seasons show considerable uniformity. Within the district, the seasons show local variations also. In the western part, near the Sahyadris, it is always cooler than in the eastern part, which is liable to hot winds during April and May.

### **2.1.3 Soil**

The district is divided into three broad soil zones, as below:

- (1) The western part of this district is covered with laterite soils, which are less fertile;
- (2) Central part is covered with brownish well-drained soils;
- (3) The dry eastern zone is covered with medium to deep black soil of varying depth.

### **2.1.4 Rainfall**

The rainfall is not uniform in all parts of the district. The average annual rainfall in the district varies widely from about 600 mm. in Shirol tahsil to 6,000 mm. in Gagan Bavada near Sahyadri in the west. The district gets rain from the south-west as well as from the north-east monsoon.

### **2.1.5 Rivers**

There are four main rivers in the district, namely, Warana, Panchaganga, Dudhaganga and Hiranyakeshi. Panchaganga is formed by five rivers, namely, Bhogawati, Tulshi, Dhamani, Kumbhi and Kasari. These rivers are flowing from west to east. Other rivers in southern part of Kolhapur district run for short distance within the district territory; they are Chikotra, Ghataprabha and Tamraparni. These rivers are flowing eastwards. Tilar river is flowing westwards.

### **2.1.6 Crops**

In Kolhapur district, Kharif and Rabi are two main cultivating seasons. Kharif crops like paddy, Ragi, Jowar and Nachani, and Rabi crops like wheat and Jowar, are taken. Paddy is the most important cereal crop and sugarcane is the main cash crop. Major part of Kolhapur district comes under high rainfall zone; therefore, paddy crop predominates whereas in the low rainfall zones comprising Karvir, Hatkanangale, Shirol and Kagal talukas, grow Jowar, wheat, maize and vegetable crops. Perennial sugarcane is taken in all parts wherever adequate irrigation facilities are available. Table 2.1 brings out the relative position of important crops in the district in 1988-89.

**Table 2.1**  
Crops position in Kolhapur district  
(1988-89)

Sr. No.	Crop	Percentage in area
1	Sugarcane	11
2	Paddy	24
3	Jowar	11
4	Wheat	3
5	Groundnut	11
6	Pulses	3
7	Vegetables	10
8	Other Crops	27
<b>Total</b>		<b>100</b>

Source: Irrigation Booklet, 1939.

## 2.2 IRRIGATION NETWORK IN KOLHAPUR DISTRICT

### 2.2.1 Development of irrigation

Kolhapur district has 7,62,000 ha. physical gross area, out of which 5,21,000 ha. area is culturable and out of this, 2,16,111 ha. is irrigable. The irrigated area was 58,956 ha. in 1981. It increased to 74,856 ha. in 1989. In Kolhapur district, irrigation development is satisfactory but unbalanced. Irrigation facility is largely available to Karvir, Panhala, Radhanagari, Hatkanangale and Shirol talukas, due to completion of Radhanagari and Tulshi Projects. But Chandgad, Ajra, Gagan Bavada, Shahuwadi, Bhudargad, Kagal and Gadhinglaj taluks are devoid of adequate irrigation facilities. Balanced irrigation

in the district is possible after the completion of the major projects like Dudhaganga and Warana and many medium as well as minor schemes. Table 2.2 gives taluka-wise details of irrigation facility.

Table 2.2 indicates that in Kolhapur district, the level of irrigation has increased during 1981-89, from 58,956 to 74,856 hectares. This was due to completion of 24 minor irrigation schemes. But the development remained unbalanced. In 1989, the irrigated area as percentage of cultivated area was maximum in Karvir taluka (35.27 percent) followed by Shirol taluka (32.44 percent) and Hatkanangale taluka (25.78 percent). It was minimum in Shahuwadi (2.75 percent) followed in ascending order by Gagan Bavada (5.60 percent), Ajra (6.09 percent) and Bhudargad (6.41 percent) talukas. Maximum irrigation is possible upto 41.48 percent of culturable area, but at present, only 14.64 percent area is irrigated. However, with reference to past years, this noteworthy improvement as the percentage of irrigated land went up to 11.53 in 1981 and further to 14.64 in 1989.

### **2.2.2 Nature of Irrigation**

In Kolhapur district, the irrigation system has a mix-up of major, medium and minor projects. The schemes comprise lift irrigation, well irrigation, percolation tanks, nala bunding, etc. Among these, lift irrigation is more common, because it is very suitable for undulating terrain, its gestation

Table 2.2

Taluka-wise position of irrigation facility in Kolhapur district

Sr. No.	Taluka	Total Area	Cultivated Area	Irrigated Area 1971	Irrigated Area 1981	Irrigated Area 1989	(Area in hectares)		
							Irrigated area as % of cultivated area 1981	Irrigated area as % of total area in 1989	Irrigated area of 1989 as % of total area in 1989
1	Karvir	60,163	51,716	4,965	13,022	18,241	25.18	35.27	30.32
2	Panhala	56,867	40,028	4,058	4,058	5,221	10.14	13.04	9.18
3	Hatkanangale	56,301	49,128	4,621	9,698	12,669	19.74	25.78	22.50
4	Shirol	46,397	39,070	7,468	12,674	12,674	32.44	32.44	27.32
5	Kagal	51,429	44,712	2,843	3,147	3,724	7.04	8.32	7.24
6	Gadhinglaj	44,625	17,845	2,349	3,104	4,116	17.04	23.06	9.22
7	Chandgad	83,380	40,222	2,158	3,013	3,475	7.49	8.63	4.16
8	Ajra	55,184	35,294	810	832	2,146	2.36	6.09	3.88
9	Bhudargad	63,628	37,362	1,628	2,398	2,398	6.42	6.41	3.76
10	Radhanagari	88,173	47,040	4,809	4,228	5,925	8.99	12.60	6.72
11	Gagan Bavada	69,708	44,759	816	1,168	2,503	2.52	5.60	3.59
12	Shahuwadi	1,03,811	64,092	-	1,615	1,764	2.52	2.75	1.70
<b>Total</b>		<b>7,79,667</b>	<b>5,11,227</b>	<b>36,525</b>	<b>58,956</b>	<b>74,856</b>	<b>11.53</b>	<b>14.64</b>	<b>9.60</b>

Sources: 1. Reports of Irrigation Circle, Kolhapur,  
2. Kolhapur District Census, 1971 and 1981.

period is less, no extensive drainage arrangements are required and extension of command to higher elevation is possible. In Kolhapur district, 70.79 percent irrigation is done by lift-irrigation, as can be seen from details in Table 2.3. Well irrigation shares 21.90 percent and 'other' sources have only 7.30 percent share.

**Table 2.3**  
Nature of irrigation in Kolhapur district  
(Area in hectares)

Sr. No.	Taluka	Irrigated Area	Well Irrigation	Lift Irrigation	Others
1.	Karvir	13,022 (106.00)	1,780 (13.67)	10,341 (79.41)	901 (6.92)
2.	Panhala	4,058 (100.00)	584 (14.39)	3,474 (85.61)	-
3.	Hatkanangale	9,698 (100.00)	4,211 (43.42)	5,098 (52.57)	389 (4.01)
4	Shirol	12,674 (100.00)	2,559 (18.21)	9,736 (33.84)	379 (47.95)
5	Kagal	3,147 (100.00)	573 (18.21)	1,065 (33.84)	1,509 (47.95)
6	Gadhinglaj	3,103 (100.00)	1,309 (42.18)	1,650 (53.17)	144 (4.64)
7	Chandgad	3,013 (100.00)	998 (33.12)	1,785 (59.24)	230 (7.63)
8	Ajra	832 (100.00)	140 (16.83)	591 (71.03)	101 (12.14)
9	Bhudargad	2,398 (100.00)	143 (5.96)	1,808 (75.40)	447 (18.64)
10	Radhanagari	4,228 (100.00)	369 (8.73)	3,761 (88.95)	98 (2.32)
11	Gagan Bavada	1,168 (100.00)	-	1,164 (99.66)	4 (0.34)
12	Shahuwadi	1,615 (100.00)	248 (15.36)	1,264 (78.27)	103 (6.38)
<b>Total</b>		<b>58,956 (100.00)</b>	<b>12,914 (21.90)</b>	<b>41,737 (70.79)</b>	<b>4,305 (7.30)</b>

Note: Figures in parentheses are percentage to total irrigated area.  
Source: Kolhapur District Census Handbook, 1981.

Except Hatkanangale, Kagal, Gadhinglaj and Chandgad talukas, all the remaining talukas have more than three-fourths of their irrigation done through the lift system. Gagan Bhavada has almost all irrigation (99.66 percent) through the lift. Kagal taluka trails last (33.84 percent) in this respect; it depends more on 'other' sources (47.95 percent). Well irrigation is conspicuous in Hatkanangale, Gadhinglaj and Chandgad talukas.

### **2.2.3 Irrigation development during Five Year Plans**

#### **2.2.3.1 Major Projects**

In Kolhapur district, there are four major irrigation projects, namely, Radhanagari, Tulshi, Warana and Dudhaganga. Of them, Radhangari and Tulshi are completed and their potential irrigation is 32,271 hectares. In the Fifth Five Year Plan period, Warana and Dudhaganga are taken for construction. After completion of these two Projects, total irrigation potential of 83,796 hectares will be created in Kolhapur district. At present, construction works of these projects are in progress and partial storage has been created in the dams, with the result that nearly 5,000 hectares are irrigated through lifts in Dudhaganga valley and 2,000 hectares are irrigated through lifts in Warana valley. The work of the canals of both the porojects has lagged behind and as such, canal irrigation could not be resorted to so far. The official policy has given priority to completion of the dam and the canal work would follow thereafter.

### 2.2.3.2 Medium Projects

There are seven medium irrigation projects in Kolhapur district, namely, Kasari, Kumbi, Kadvi, Patgaon, Chikotra, Chitri and Jangamhatti. Kasari, Chikotra and Kadvi are taken for construction at the end of Fifth Five Year Plan whereas Patgaon and Kumbhi are taken for construction at the beginning of the Sixth Five Year Plan. However, the progress of all the projects is beyond satisfaction. Progress of Kumbhi, and Kaddvi is at snail's pace while the work of Chikotra project is totally stopped due to the opposition of the affected persons and political interference. The work of Jangamhatti project has been taken up at the end of the Sixth Five Year Plan and is in progress. The work of Chitri project is proposed to be taken up during the Eighth Five Year Plan and is yet to be started.

In case of Kasari and Patgaon irrigation projects, partial storage has been created leading to the irrigation potential of 3,860 hectares from Kasari and 1,500 hectares from Patgaon projects. After completion of all the seven medium irrigation porjects, 48,464 hectares irrigation potential will be created in Kolhapur district. Table 2.4 exhibits the highlights of the projects.

### 2.2.3.3 Minor irrigation

So far, 69 minor irrigation schemes have been completed and 18,070 hectares land has been brought under



**Table 2.4**  
Medium irrigation projects in Kolhapur district

Sr. No.	Project	River	Taluka benefitted	Area irrigable in ha.	Utilisation in ha.
1	Kasari	Kasari	Shahuwadi	9,458	3,946
2	Chikotra	Chikotra	Kagal	4,696	320
3	Kadvi	Kadvi	Shahuwadi	9,219	1,402
4	Patgaon	Vedganga	Bhudargad	7,960	1,500
5	Kumbhi	Kumbhi	Gagan Bavada	8,711	821
6	Jangamhatti	Tamraparni	Chandgad	2,570	80
7	Chitri	Chitri	Ajara	5,850	2,740
<b>Total</b>				<b>48,464</b>	<b>13,809</b>

Source: Report of Kolhapur Irrigation Circle.

irrigation. The minor irrigation schemes consist of minor dams and Kolhapur-type weirs. At present, 14 minor irrigation schemes are under construction with irrigation potential of 3,545 hectares. Table 2.5 gives details of the completed minor schemes.

**Table 2.5**  
Completed minor irrigation schemes in Kolhapur district

Sr. No.	Five Year Plan	Number of Schemes	Irrigation Potential (hectares)	Outlay (Rs.in lakhs)
1	First	2	115	3.45
2	Second	1	620	2.15
3	Third	5	1,863	14.59
4	Annual Plans	10	1,679	38.42
5	Fourth	15	3,792	112.85
6	Fifth	12	3,620	127.21
7	Sixth	18	5,360	646.04
8	Seventh	6	1,021	133.74
<b>Total</b>		<b>69</b>	<b>18,070</b>	<b>1,078.45</b>

Source: Reports of Kolhapur Irrigation Circle

### **Kolhapur-type weirs**

Kolhapur-type weirs are in use for more than fifty years in Kolhapur district. They are open-type weirs across streams. The area of application is identified as hilly and geographically unsuitable for conventional flow irrigation. Irrigable area is spread in small patches. Kolhapur district is probably the only example where full irrigation potential has been created through lift irrigation and Kolhapur-type weirs, so far as public schemes are concerned.

### **Well irrigation**

Well irrigation in Kolhapur district is done individually since ancient times. Total irrigation on well was 10,073 hectares in 1971, which increased to 12,914 hectares in 1981. The ground water available in Panchaganga sub-basin of Krishna basin in Kolhapur district is about 307.53 M.cu.m., out of which, 125.58 M.cu.m. is used from 8,370 wells for irrigation in the Panchaganga sub-basin and additional 181.95 M.cu.m. will be made available for further use of ground water for irrigation by taking 12,127 additional wells. These details are given as per the estimates of the Ground Water Development Agency, Kolhapur.

#### **2.2.4 Total outlay on irrigation during the Five Year Plans**

During the Five Year Plans, large investment is made on irrigation development in Kolhapur district. Upto Fifth Five Year Plan, minor irrigation schemes were taken up on priority basis as they gave immediate returns. Later, however, the

priority was shifted in favour of major and medium projects, as they were capable of covering vast area under their command. As a result, from Fifth to Seventh Five Year Plans, large outlay was allocated for the bigger projects. As per Table 2.6, during the Five Year Plans, total outlay on irrigation was Rs.26,102.41 lakhs, out of which Rs.23,420.12 lakhs were devoted to major projects, Rs.1,602.69 lakhs to medium projects and Rs.1,079.60 lakhs to minor irrigation works. As a result of heavy investment through the Five Year Plans, total irrigation potential reached to 1,76,751 hectares; shares of major, medium and minor irrigation schemes being 65.67 percent, 24.11 percent and 10.22 percent respectively. As regards the share in total expenditure, major irrigation project come out with a lion's share of 89.72 percent, leaving just 6.14 percent to medium projects and 4.14 percent to minor projects.

Table 2.6

Outlay on irrigation during the Five Year Plans

Sr. No.	Plans	Outlay (Rs.in Lakhs)			Irrigation Potential (Hectares)				
		Major	Medium	Minor	TOTAL	Major	Medium	Minor	TOTAL
1	First	-	-	3.45	3.45	26,560	-	115	26,675
2	Second	-	-	2.45	2.15	-	-	620	620
3	Third	-	-	14.59	14.59	-	-	1,863	1,863
4	Annual	722.22	-	38.42	760.64	5,711	-	1,679	7,390
5	Fourth	-	-	112.85	112.85	-	-	3,792	3,792
6	Fifth	4,442.52	925.36	127.21	5,494.57	83,796	23,373	3,620	1,10,789
7	Sixth	9,051.34	677.33	646.04	10,375.21	-	19,241	5,360	24,601
8	Seventh (1985-89)	8,532.30	-	134.14	8,666.44	-	-	1,021	1,021
Total		23,420.12	1,602.69	1079.60	26,102.41	1,16,067	42,614	18,070	1,76,751

Source: Irrigation in Kolhapur District, Annual Report, 1989.

## APPENDIX - A

Major irrigation projects completed and under construction in Kolhapur district

Sr. No.	Major Project Name	Completed		Under construction	
		Radhanagari	Tulshi	Warana	Dudhaganga
1	Village Taluka District	Radhanagari Kolhapur	Dhamod Radhanagari Kolhapur	Chandoli Shirala Sangli	Asangaon Radhanagari Kolhapur
2	River	Bhogawati	Tulshi	Warana	Dudhaganga
3	Catchment Area (sq.km.)	109	35	301	196
4.	Dam				
	1. Length of Masonry dam (metres)	1,036	-	743	490
	2. Length of Earthen dam (metres)	-	1,314	837	790
	3. Maximum height of the dam (metres)	38.41	48.68	77.00	74.00
	4. Spillway				
	i. Type	Ogee shaped	Ogee shaped	Ogee shaped	Ogee shaped
	ii. Length (metres)	106	198	57	71
	iii. No. of gates	7	3	4	5
5	Storage (M.cum.)				
	1. Gross storage	236.79	98.29	963.97	701.78
	2. Live storage	219.97	91.92	780.00	663.83
6	Submergence Area (Ha.)	1,822	717	4,559	4,360
7	Command Area (Ha.)				
	1. Gross	59,110	-	50,370	73,340
	2. Irrigable	26,560	4,720	36,848	46,948
				(from Kolhapur dist.)	

Sources: 1. Project Reports of Radhanagari, Tulshi, Warana and Dudhaganga Projects.



# APPENDIX - B

Medium irrigation projects under construction in Kolhapur District

Sr. No.	Medium Project	Kasari	Kumbhi	Kadavi	Patgaon	Jangamhatti	Chitri	Chikotra
1.	Village Taluka District	Gelawade Shahuwadi Kolhapur	Lakhamapur G.Bavada Kolhapur	Parlininai Shahuwadi Kolhapur	Patgaon Bhudargad Kolhapur	Jangamhatti Chandgad Kolhapur	Rajewadi Ajara Kolhapur	Zulpewadi Ajara Kolhapur
2	River	Kasari	Kumbhi	Kadavi	Vedganga	Honhal Tamraparni	Chitri Hiranayakeshi	Chikotra
3	Catchment area(sq.km.)	33.28	21.20	34.10	26.08	21.40	27.85	29.36
4	Storage (M.cu.m.)							
	(1) Gross Storage	78.56	76.88	71.24	76.26	27.29	53.41	30.22
	(2) Live Storage	77.96	76.49	70.56	75.79	26.29	52.36	29.15
5	Dam (earthen)							
	(1) Length (metres)	297	906	1,349	1,045	900	1,675	640
	(2) Max.height(metres)	44.24	42.58	35.45	36.69	28.90	55.11	42.21
	(3) Waste-weir Length (metres)	41.00	26.50	170.00	152.00	175.00	152.16	121.95
	i. Type	Ogee shaped (gated)	Ogee shaped (gated)	Ogee shaped (ungated)	Bar-type	Ogee shaped (ungated)	Ogee shaped (ungated)	Bar-type
	ii. No.of gates	3	2	-	-	-	-	-
6	Submergence							
	(1) Area (hectares)	534	465	465	848	390	301	N.A.
	(2) Villages	2	3	2	2	1	3	-
	(3) Population	1,707	678	667	1,161	145	520	-
7	Command Area (hectares)							
	(1) Gross	12,141	10,189	12,232	10,882	3,440	13,085	4,548
	(2) Irrigable	9,458	8,711	9,219	7,960	2,570	5,850	3,482
8	Cost of Project (Rs.in Lakhs)	615.18	460.81	347.30	539.65	350.13	1,230.27	1,146.50
		1,401.32 (revised)		1,355.73 (revised)	2,042.39 (revised)			

Sources: Project Reports of Kasari, Kumbhi, Kadavi, Patgaon, Jangamhatti, Chitri and Chikotra Projects.